Implementation Science: An Introduction

LINDSEY ANN MARTIN, PHD

PROGRAM OFFICER

POPULATION HEALTH BRANCH

DIVISION OF EXTRAMURAL RESEARCH & TRAINING

SUPERFUND RESEARCH PROGRAM

JANUARY 14TH, 2021

National Institute of Environmental Health Sciences

Poll Question #1

- **What is your level of familiarity with Implementation Science?**
  - Not at all familiar
  - Beginner (e.g., heard a lecture on Implementation Science)
  - Intermediate (e.g., taken a course on Implementation Science)
  - Advanced (e.g., published a paper on Implementation Science)

Research to Practice Gap in Health Care

- Balas & Boren 2000
- Grant et al. 2003
- Morris et al. 2011

Effectiveness does not Equal Public Health Impact

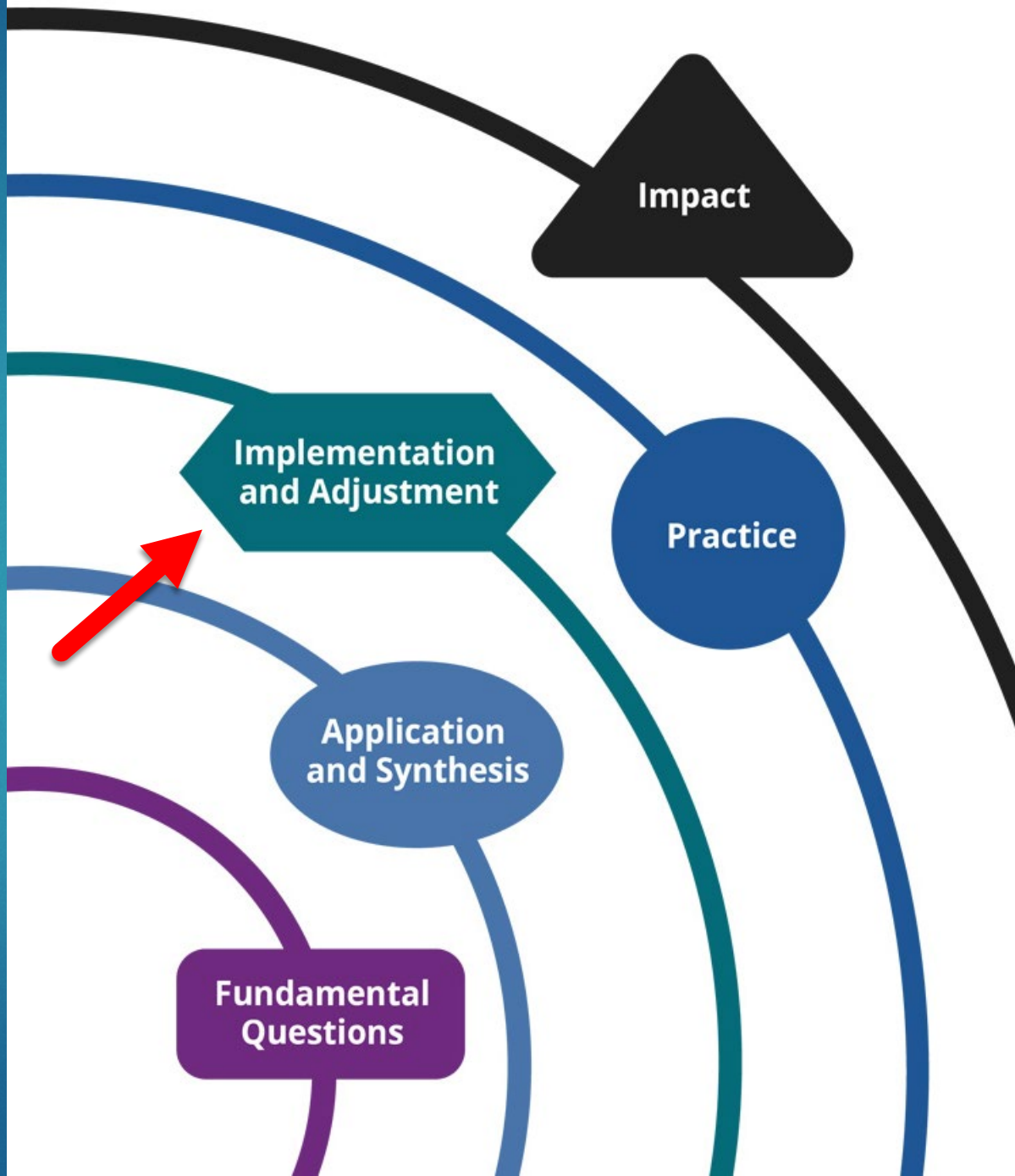
BAUER & KIRCHNER 2020

Enter Implementation Science

Implementation Science focuses on the "how" question

NIEHS Translational Research Framework

- Pettibone et al. (2018) Expanding the Concept of Translational Research: Making a Place for Environmental Health Sciences



Implementation Science: NIH Definition

Implementation science (IS) is the study of **methods** to promote the adoption and integration of evidence-based practices, interventions, and policies into routine health care and public health settings to improve our impact on population health

https://cancercontrol.cancer.gov/is/about

Geoffrey Curran (2020) Implementation Science Made Too Simple: A Teaching Tool. Implementation Science Communications

- "The intervention/practice/innovation is **THE THING**
- ***Effectiveness*** research looks at whether **THE THING** works
- ***Implementation*** research looks at how best to help people/places **DO THE THING**
- Implementation strategies are the **stuff we do** to try to help people/places **DO THE THING**
- Main implementation outcomes are **HOW MUCH** and **HOW WELL** they **DO THE THING**"

Applying Implementation Science to Environmental Health: Example

- ***Educational intervention*** (i.e., **THE THING**) to help the local community identify and avoid common sources of lead exposure

- ***Effectiveness research*** helps investigators evaluate if **THE EDUCATIONAL INTERVENTION** works by measuring blood lead levels among community members that used **THE THING**

- ***Implementation research*** can help investigators figure out how to help the community **DO THE EDUCATIONAL INTERVENTION (i.e., THE THING)** to have the greatest impact on public health

- Implementation researchers identify and study **strategies** like e.g., holding community meetings so individuals can learn about **THE THING**; forming a community advisory board that provides researchers feedback on the implementation process and improvements

- So, this is the **stuff we do** (i.e., implementation ***strategies***) to help the community **DO THE EDUCATIONAL INTERVENTION**

Powell *et al. Implementation Science* (2015) 10:21
DOI 10.1186/s13012-015-0209-1

IMPLEMENTATION SCIENCE

RESEARCH Open Access

A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project

Byron J Powell[1*], Thomas J Waltz[2], Matthew J Chinman[3,4], Laura J Damschroder[5], Jeffrey L Smith[6], Monica M Matthieu[6,7], Enola K Proctor[8] and JoAnn E Kirchner[6,9]

Seventy-Three Implementation Strategies

Example ERIC Strategies

(Powell 2015)

Build a coalition (partners in the implementation process)	Conducting educational meetings	Conducting educational outreach visits
Create a learning collaborative around the innovation	Facilitation	Identify and prepare champions
Identify early adopters	Inform local opinion leaders (i.e., those influential in the implementation setting)	Using advisory boards and workgroups

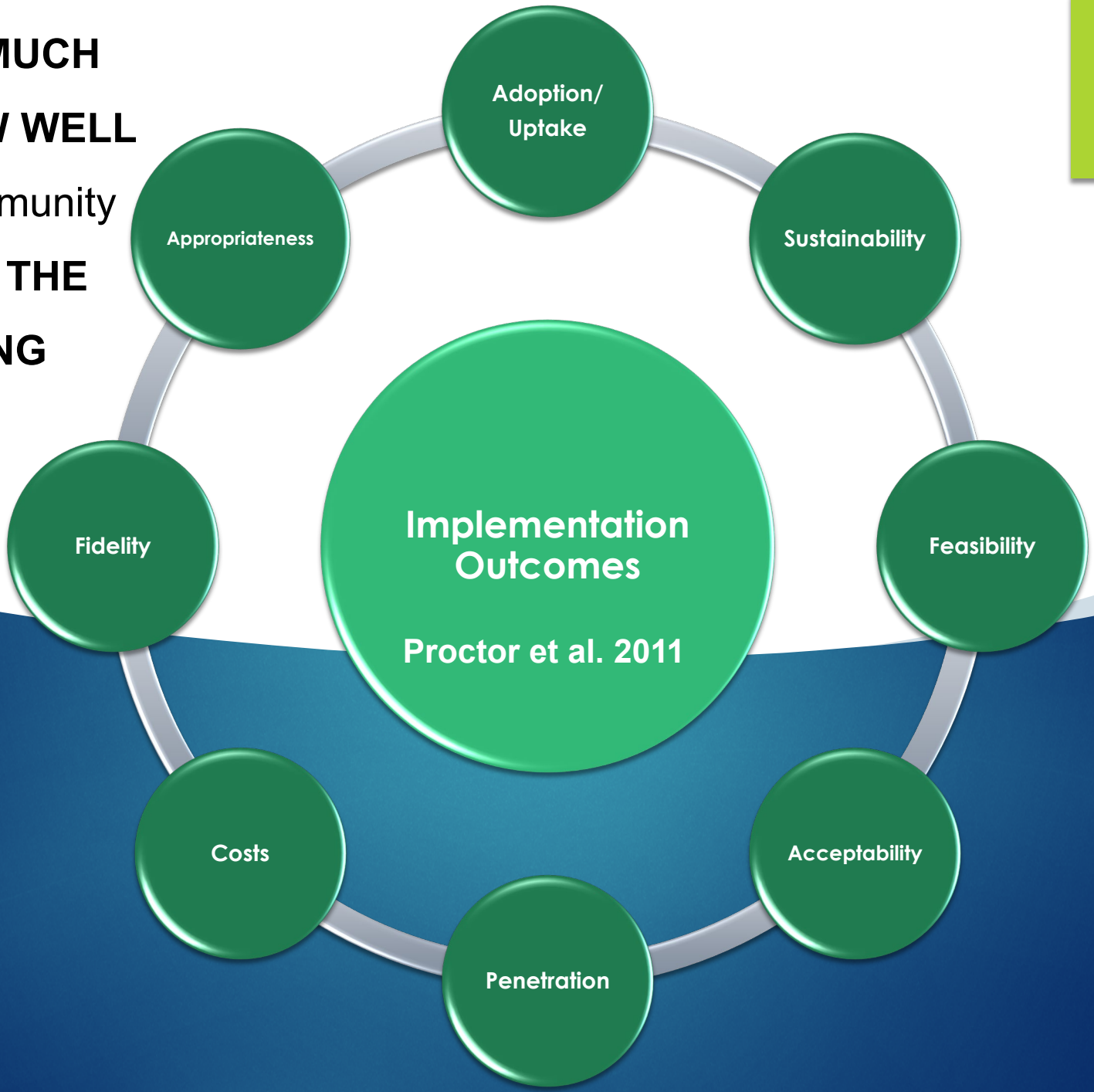
HOW MUCH

and **HOW WELL**

the community

DOES THE

THING



Poll Question #2
Effectiveness or Implementation

A study that proposes to compare two personal air monitoring devices to measure levels of PM2.5 in two communities bordering a major industrial complex. Community A will receive one type of air monitor; community B will receive another type of air monitor. Outcomes will evaluate how well the two monitors accurately measure levels of air pollution in each community

Is this effectiveness research or implementation research?

Poll Question #3
Effectiveness or Implementation

A study that tests different strategies to improve the uptake of an intervention that has shown to improve the environmental health literacy of communities exposed to high levels of heavy metals

Is this effectiveness research or implementation research?

Hybrid Designs:
Enhancing Translation Potential

- **Hybrid 1:**
  - Effectiveness
    - Implementation
- **Hybrid 2:**
  - Effectiveness - Implementation
- **Hybrid 3:**
  - Implementation
    - Effectiveness

Curran et al. (2012). Effectiveness-implementation hybrid designs: combining elements of clinical effectiveness and implementation research to enhance public health impact *Med Care*.

Individual-Community-Organization-& System-levels

See Tabak et al. (2013) p. 5

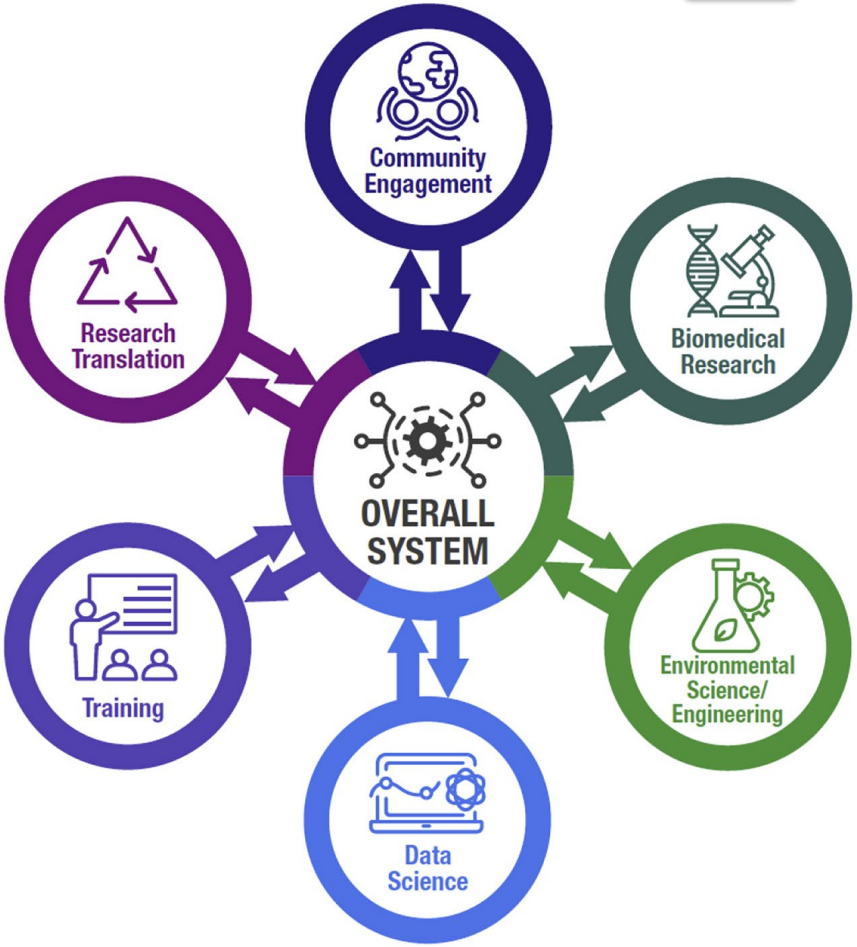
Theories, Models and Frameworks

(Nilsen 2015)

- **Process Models**
  - Guide the implementation process (e.g., Exploration, Preparation, Implementation, Sustainment (EPIS) Framework https://episframework.com)
- **Determinant Frameworks**
  - Implementation outcomes are impacted by barriers and facilitators (e.g., Consolidated Framework for Implementation Research (CFIR) https://cfirguide.org/)
- **Evaluation Frameworks**
  - Help researchers frame implementation success (e.g., Reach, Effectiveness, Adoption, Implementation & Maintenance (RE-AIM https://www.re-aim.org/)

Integrating Implementation Science into the Superfund Research Program Systems Approach

2020 SRP Strategic Plan



Reviews on Environmental Health 2021; 10.1515/reveh-2020-0073

Objective One

- Promoting Interaction between SRP and Its Stakeholders
- Stakeholder engagement is crucial in Implementation Science and inherently requires the participation of multiple stakeholders in the implementation process

Objective One

- Prioritizing critical research areas: "move away from one-size-fits all approaches in environmental health research and incorporate more comprehensive approaches that draw on different methods"
- Implementation Science fundamentally draws upon multiple methods to address the complexities and contextual nuances in the implementation process

Objective Two

- Goal of encouraging investigator-initiated research translation
- Implementation Science has the potential to use strategies to move SRP innovations into real world settings to mitigate exposure and increase uptake of new technologies

Objective Two

- Goal of focusing Community Engagement Cores to engage in prevention and intervention activities
- Public health impact = Implementation Science + Community Engaged Research approaches (see Blachman-Demner et al. 2017)

Objective Three

- Goal of promoting transdisciplinary science
  - SRP support of research that identifies barriers/facilitators to effective prevention/intervention activities
- Implementation Science is transdisciplinary in nature with a focus on identifying barriers/facilitators to the uptake of innovations

NIH Funding Opportunity Announcements in Implementation Science

- Dissemination and Implementation Research in Health (R01 Clinical Trial Optional)
- Dissemination and Implementation Research in Health (R21 Clinical Trial Optional)
- Dissemination and Implementation Research in Health (R03 Clinical Trial Not Allowed)

- Demonstrating a clear gap
- Identifying the evidence-based intervention, practice, policy **(THE THING)**
- Conceptual models/theory (research question(s), measures and outcomes)
- Stakeholder engagement
- Setting/community readiness for implementation
- Clearly identified implementation strategies **(THE STUFF WE DO)**
- Team experience
- Feasibility of design/methods
- Measurement/analysis: identifying **implementation outcomes**/link to theory/model
- Policy implications: describing the link between implementation of **THE THING** with policy

Contact Information

- Email: Lindsey.Martin@nih.gov
- Twitter: @LAMartinPhD

References

- Balas EA, Boren SA. Managing clinical knowledge for health care improvement. Yearbook of Medical Informatics. Schattauer: Stuttgart; 2000. p. 65–70.
- Grant J, Green L, Mason B. Basic research and health: a reassessment of the scientific basis for the support of biomedical science. Res Eval. 2003;12:217–24.
- Morris ZS, Wooding S, Grant J. The answer is 17 years, what is the question: understanding time lags in translational research. J Roy Soc Med. 2011;104:510–20.
- Bauer MS, Kirchner J. Implementation science: What is it and why should I care? Psychiatry Res. 2020 Jan;283:112376. doi: 10.1016/j.psychres.2019.04.025. Epub 2019 Apr 23. PMID: 31036287.
- Pettibone KG, Balshaw DM, Dilworth C, et al. Expanding the Concept of Translational Research: Making a Place for Environmental Health Sciences. *Environ Health Perspect*. 2018;126(7):074501. Published 2018 Jul 16. doi:10.1289/EHP3657
- Curran GM. Implementation science made too simple: a teaching tool. *Implement Sci Commun*. 2020;1:27. Published 2020 Feb 25. doi:10.1186/s43058-020-00001-z
- Powell BJ, Waltz TJ, Chinman MJ, et al. A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. *Implement Sci*. 2015;10:21. Published 2015 Feb 12. doi:10.1186/s13012-015-0209-1
- Proctor E, Silmere H, Raghavan R, et al. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Health*. 2011;38(2):65-76. doi:10.1007/s10488-010-0319-7
- Curran GM, Bauer M, Mittman B, Pyne JM, Stetler C. Effectiveness-implementation hybrid designs: combining elements of clinical effectiveness and implementation research to enhance public health impact. Med Care. 2012;50(3):217-226. doi:10.1097/MLR.0b013e3182408812
- Tabak RG, Khoong EC, Chambers D, Brownson RC. Models in dissemination and implementation research: useful tools in public health services and systems research. Front Public Health Serv Syst Res 2013; 2(1). DOI: 10.13023/FPHSSR.0201.08
- Nilsen P. Making sense of implementation theories, models and frameworks. Implement Sci. 2015;10:53. Published 2015 Apr 21. doi:10.1186/s13012-015-0242-0
- Blachman-Demner DR, Wiley TRA, Chambers DA. Fostering integrated approaches to dissemination and implementation and community engaged research. *Transl Behav Med*. 2017;7(3):543-546. doi:10.1007/s13142-017-0527-8
- Proctor EK, Powell BJ, Baumann AA, Hamilton AM, Santens RL. Writing implementation research grant proposals: ten key ingredients. Implement Sci. 2012;7:96. Published 2012 Oct 12. doi:10.1186/1748-5908-7-96